

## REMARKS

Reconsideration and the timely allowance of the pending claims, in view of the following remarks, are respectfully requested.

By this Amendment, the specification and claims 60-65 are newly added. The Specification is amended to add the priority information. Support for new claims 60-65 may be found in the various embodiments disclosed throughout the original disclosure. No new matter has been added. Accordingly, after entry of this Amendment, claims 46-65 will be pending in the patent application.

Claims 46, 48, 51-53, 55, 58 and 59 were rejected under 35 U.S.C. §102(b) as allegedly being unpatentable based on JP 01-274398 to Nakahigashi *et al.* (hereinafter “Nakahigashi”), or in the alternative, under 35 U.S.C. §103(a) based on Nakahigashi in view of JP 11-067737A to Koshimizu. The rejection is respectfully traversed.

Claim 46 recites a plasma processing apparatus for applying a plasma process to a substrate, the plasma processing apparatus comprising, *inter alia*, “a process chamber in which the substrate is subject to the plasma process; a plasma source that generates plasma in the process chamber; a gas introducing portion configured to introduce a gas into the process chamber; a first vacuum device that evacuates the gas from said process chamber; a second vacuum device that evacuates gases from said gas introducing portion; and a gas exhaust line connecting said gas introducing portion to said second vacuum device, wherein said gas introducing portion includes: an inlet port through which the gas is introduced into said gas introducing portion; an outlet port through which the gas is evacuated from said introducing portion by said second vacuum device; a gas passage provided in said gas introducing portion and connected to said inlet port and said outlet port; and a plurality of gas nozzles connected to said gas passage, wherein said gas exhaust line is directly connected to said outlet port of said gas introducing portion.”

It is respectfully submitted that there is nothing in Nakahigashi that remotely discloses, teaches or suggests each and every feature recited in claim 46. In order to establish a *prima facie* rejection, “the identical invention **must** be shown **in as complete detail as is contained in the ... claim.**” (See MPEP § 2131, citing *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989), emphasis added). MPEP §2131 also indicates that “the elements **must be arranged as required by the claim.**” (See MPEP §2131, citing *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990), emphasis added). Nakahigashi does not meet these requirements.

By way of review, Nakahigashi discloses an ECR plasma source that includes a plasma production chamber 1, a process chamber 6 (identified by the Office Action as the “process chamber” of claim 46) in which a substrate 7 is located, and a gas resolution chamber 12, which is positioned between the plasma production chamber 1 and the process chamber 6. (See, e.g., English abstract and FIG. 1 of Nakagashi). The gas resolution chamber 12 includes multiaperture electrodes 13, inlets 14 and outlets 15. *Id.*

The Examiner concedes that Nakahigashi is silent as to “a second vacuum device that evacuates gases from said gas introducing portion.” (See page 3, lines 19-22 and page 4, lines 1-3 of the Office Action). However, there are additional features that are absent in Nakahigashi.

For example, unlike claim 46, Nakahigashi fails to disclose, teach or suggest a “process chamber in which the substrate is subject to the plasma process; [and] a plasma source that generates plasma in the process chamber.” The Examiner has manifestly failed to consider these features. The apparatus of Nakahigashi is not a plasma apparatus as defined in claim 46, but merely an ECR apparatus that is structurally different from that of claim 46.

According to claim 46, the plasma apparatus includes a process chamber in which a plasma process is applied to a substrate. Thus, in claim 46, the plasma is formed in the process chamber where the substrate is located. This is in striking contrast with the ECR apparatus of Nakahigashi where the plasma is formed in a plasma production chamber 1 that is separate from the process chamber 6 where the substrate is located. (See, e.g., English abstract and FIG. 1 of Nakahigashi). Unlike claim 46, no plasma is generated in the process chamber 6 of Nakahigashi. The plasma generating chamber 1 of Nakahigashi is separate from the process chamber 6 with the gas decomposition chamber 12 positioned in between. The plasma generated in the plasma production chamber 12 of Nakahigashi merely contacts the gases in the gas decomposition chamber 12, but, in no way is it supplied to the process chamber 6. As such, a plasma process is not applied in the process chamber 6 of Nakahigashi. Thus, for at least this reason, claim 46 is patentable over Nakahigashi.

Equally important is the fact that there is no motivation or suggestion to produce a plasma in the process chamber 6 of Nakahigashi. Not only would this modification change the principle operation of the apparatus of Nakahigashi, it would also prevent the dissociated gas from reaching the substrate. The Examiner must realize that any plasma generated in the process chamber 6 will act as a shield that prevents the dissociated gas generated in the gas

decomposition chamber 12 from reaching the substrate. Therefore, such a modification would render the ECR apparatus unsatisfactory for its intended purpose.

Koshimizu fails to remedy the deficiencies of Nakahigashi. Koshimizu discloses a plasma processing apparatus that includes a plasma generating space 132 and a processing space 134. (See, e.g., FIGS. 4 and 7 of Koshimizu). The plasma generating space 132 is separated from the processing space 134 by a grid electrode 128 including apertures 128a. *Id.* Thus, any proper combination of Nakahigashi and Koshimizu cannot result, in any way, in the invention of claim 46.

Furthermore, Applicants respectfully submit that Koshimizu, in and of itself, fails to disclose, teach or suggest each and every feature of claim 46.

Assuming, *arguendo*, that the plasma processing space 134 and the plasma generating space 132 of Koshimizu correspond, respectively, to the process chamber and the gas introducing portion of claim 46, Koshimizu does not disclose, teach or suggest “a plasma source that generates plasma in the process chamber”, as recited in claim 46.

On the other hand, assuming, *arguendo*, that the plasma generating space 132 and the plasma processing space 134 together form the process chamber of claim 46, Koshimizu does not disclose, teach or suggest a gas introducing portion and an outlet connected to the gas introducing portion. The outlet 608 of Koshimizu would merely be connected to the process chamber.

Claims 48 and 51-52 are patentable over Nakahigashi, Koshimizu and any combination thereof at least by virtue of their dependency from claim 46 and for the additional features recited therein.

Claim 53 is patentable over Nakahigashi, Koshimizu and any combination thereof for at least similar reasons as provided above for claim 46 and for the features recited therein. For example, Nakahigashi, Koshimizu and any combination thereof do not disclose, teach or suggest a plasma processing apparatus for applying a plasma process to a substrate, the plasma processing apparatus comprising “a process chamber in which the substrate is subject to the plasma process; a plasma source that generates plasma in the process chamber; a gas introducing portion configured to introduce a gas into the process chamber; a vacuum device that evacuates the gas from said process chamber; and a bypass line having one end connected to said gas introducing portion and the other end connected to said vacuum device for evacuating the gas from said gas introducing portion, wherein said gas introducing portion includes: an inlet port through which the gas is introduced into said gas introducing portion;

an outlet port through which the gas is evacuated from said introducing portion by said vacuum device; a gas passage provided in said gas introducing portion and connected to said inlet port and said outlet port; and a plurality of gas nozzles connected to said gas passage, wherein said bypass line is directly connected to said outlet port of said gas introducing portion.”

Claims 58 and 59 are patentable over Nakahigashi, Koshimizu and any combination thereof at least by virtue of their dependency from claim 53 and for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 46, 48, 51-53, 55, 58 and 59 under 35 U.S.C. §102(b) as allegedly being unpatentable based on Nakahigashi, or in the alternative, under 35 U.S.C. §103(a) based on Nakahigashi in view of Koshimizu are respectfully requested.

Claims 47, 49, 54 and 56 were rejected under 35 U.S.C. §103(b) as allegedly being unpatentable based on Nakahigashi, or in the alternative, based on Nakahigashi in view of Koshimizu in view of McMillin *et al.* (U.S. Pat. No. 6,270,862) (hereinafter “McMillin”). The rejection is respectfully traversed.

Claims 47 and 49 are patentable over Nakahigashi, Koshimizu and any combination thereof at least by virtue of their dependency from claim 46 and for the additional features recited therein. Claims 54 and 56 are patentable over Nakahigashi, Koshimizu and any combination thereof at least by virtue of their dependency from claim 53 and for the additional features recited therein.

Koshimizu is discussed above. McMillin discloses a high density plasma CVD apparatus that includes a processing chamber 140 in which a high density plasma is generated. (See, e.g., col. 3, lines 50-55 of McMillin). The plasma is applied to a substrate located in the processing chamber. *Id.*

However, as noted above, Nakahigashi fails to disclose, teach or suggest a “process chamber in which the substrate is subject to the plasma process; [and] a plasma source that generates plasma in the process chamber” and Applicant respectfully submits that there is no motivation or suggestion to modify the ECR apparatus of Nakahigashi in view of Koshimizu and/or McMillin to provide these features. As noted above, not only would this modification change the principle of operation of the apparatus of Nakahigashi, it would also prevent the dissociated gas from reaching the substrate. Therefore, such a modification would render the ECR apparatus unsatisfactory for its intended purpose. Accordingly, for at least this reason,

the combination of Nakahigashi, Koshimizu and McMillin fails to present a *prima facie* case of obviousness.

It is also respectfully submitted that the combination Koshimizu and McMillin fails to disclose, teach or suggest each and every feature recited in claims 47, 49, 54 and 56. For example, neither Koshimizu nor McMillin discloses, teaches or suggests “a gas exhaust line connecting said gas introducing portion to said second vacuum device, wherein said gas introducing portion includes: an inlet port through which the gas is introduced into said gas introducing portion; an outlet port through which the gas is evacuated from said introducing portion by said second vacuum device; a gas passage provided in said gas introducing portion and connected to said inlet port and said outlet port; and a plurality of gas nozzles connected to said gas passage, wherein said gas exhaust line is directly connected to said outlet port of said gas introducing portion.” The plasma apparatus of McMillin merely discloses a first gas ring located under a dielectric window of a chamber. However, there is no exhaust line connected to a supply part.

The Examiner asserts that it would have been obvious to combine the teachings of Nakahigashi, Koshimizu and McMillin to use an annular ring shape “to provide an increased deposition rate.” (See page 6, lines 3-9 of the Office Action). The Examiner refers to col. 5, lines 33-38 of McMillin to support her rationale. This argument lacks merit. The cited portion of McMillin merely discloses that the use of injectors 180, which injectors are not annular, as opposed to annular rings, provides an increased deposition rate. In support of this, McMillin contrasts the apparatus of FIG. 2 with the prior art apparatus shown in FIG. 1, which prior art apparatus also includes annular rings to supply gas. McMillin discloses that the use of annular rings as a sole means to supply gas is undesirable as they lead to a decrease in deposition uniformity. (See, e.g., col. 2, lines 10-14 of McMillin). Thus, **the rationale advanced by the Examiner for combining the cited references is in clear contradiction with the express teachings of McMillin.** The Examiner has not cited any objective evidence of a motivation or suggestion to combine and modify Nakahigashi, Koshimizu and McMillin.

Accordingly, reconsideration and withdrawal of the rejection of claims 47, 49, 54 and 56 under 35 U.S.C. §103(b) as allegedly being unpatentable based on Nakahigashi, or in the alternative, based on Nakahigashi in view of Koshimizu in view of McMillin are respectfully requested.

As stated in the recent United States Supreme Court decision in *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. \_\_\_, 82 USPQ2d 1385 (2007), “Often, it will be necessary for a court to look to interrelated teachings of multiple patents ... in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be explicit.” *Id.* at Slip Opinion 14, 82 USPQ2d at 1396, citing *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, **there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness**”). (Emphasis added). Here, the Examiner has only provided conclusory statements, which are insufficient to support a *prima facie* case of obviousness.

In fact, the Examiner has not cited any objective evidence of a motivation or suggestion to combine and modify Kuwahara and Whitehead.

Claims 50 and 57 were rejected under 35 U.S.C. §103(b) as allegedly being unpatentable based on Nakahigashi, or in the alternative, based on Nakahigashi in view of Koshimizu in view of Tei et al. (U.S. Pat. No. 2002/0011215) (hereinafter “Tei”). The rejection is respectfully traversed.

Claims 50 and 57 are patentable over Nakahigashi, Koshimizu and any combination thereof at least by virtue of their dependency from claims 46 and 53, respectively, and for the additional features recited therein.

Koshimizu is discussed above. Tei discloses a plasma processing apparatus configured to treat the surface of an optical part having a non-planar surface. (See, e.g. FIG. 1 of Tei). The apparatus includes a non-planar dielectric plate 106 disposed adjacent the optical part. *Id.* A plasma is produced in the region A between the plate 106 and the optical part. (See, e.g., paragraph 85 of Tei).

However, as noted above, Nakahigashi fails to disclose, teach or suggest a “process chamber in which the substrate is subject to the plasma process; [and] a plasma source that generates plasma in the process chamber” and Applicant respectfully submits that there is no motivation or suggestion to modify the ECR apparatus of Nakahigashi in view of Koshimizu and/or Tei to provide these features. As noted above, not only would this modification change the principle of operation of the apparatus of Nakahigashi, it would also prevent the dissociated gas from reaching the substrate. Therefore, such a modification would render the ECR apparatus unsatisfactory for its intended purpose. Accordingly, for at least this reason,

the combination of Nakahigashi, Koshimizu and Tei fails to present a *prima facie* case of obviousness.

It is also respectfully submitted that the combination Koshimizu and Tei fails to disclose, teach or suggest each and every feature recited in claims 50 and 57. For example, neither Koshimizu nor Tei discloses, teaches or suggests “a gas exhaust line connecting said gas introducing portion to said second vacuum device, wherein said gas introducing portion includes: an inlet port through which the gas is introduced into said gas introducing portion; an outlet port through which the gas is evacuated from said introducing portion by said second vacuum device; a gas passage provided in said gas introducing portion and connected to said inlet port and said outlet port; and a plurality of gas nozzles connected to said gas passage, wherein said gas exhaust line is directly connected to said outlet port of said gas introducing portion.” The plasma apparatus of Tei merely discloses a flat antenna having a plurality of slits.

Accordingly, reconsideration and withdrawal of the rejection of claims 50 and 57 under 35 U.S.C. §103(b) as allegedly being unpatentable based on Nakahigashi, or in the alternative, based on Nakahigashi in view of Koshimizu in view of Tei are respectfully requested.

Claims 60-65 are newly added and define additional subject matter that is novel and non-obvious. Claims 60-65 are patentable over the cited references at least by virtue of their dependency from claim 46 or 53 and for the additional features recited therein.

All matters having been addressed and in view of the foregoing, Applicant respectfully requests the entry of this Amendment, the Examiner’s reconsideration of this application, and the immediate allowance of all pending claims.

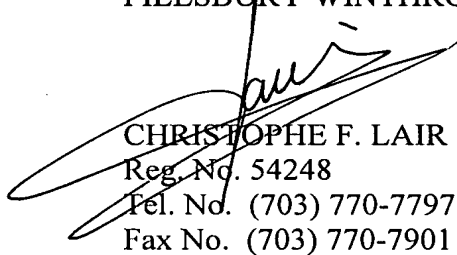
Applicant’s Counsel remains ready to assist the Examiner in any way to facilitate and expedite the prosecution of this matter. Please charge any fees associated with the submission of this paper to Deposit Account Number 033975, Order No. 040258-0279274.

HONGO *et al.* -- 09/815,305  
Attorney Docket. No. 040258-0279274

The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

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